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Research Article

Anthropogenic threats and challenges of wildlife conservation in Hamer District, South Omo, Ethiopia

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Abstract

Wildlife populations outside protected areas are highly threatened by both natural and anthropogenic factors. The present study conducted from January to February 2022, aimed to assess the major wildlife threats and evaluate the local community's willingness to participate in wildlife conservation in the Hamer District, in South Omo, Ethiopia. Questionnaire interviews were conducted among 96 sample households. As well, focus group discussions and personal observations were held to achieve the research objectives. Descriptive statistics and multiple linear regression analysis were used to analyze the data. Overall, 63.5% and 50% of the respondents ranked deforestation and overgrazing as primary and secondary threats of wildlife conservation in Hamer District, respectively. Most respondents (82.3%) reported the decreasing status of wildlife populations in their vicinity which significantly differed across sample kebeles (the lowest administration units) ($\chi 2 = 44.152$, df = 3, p = 0.000). About 90.6 percent of respondents' showed willingness to participate in wildlife conservation efforts in the area. The multiple linear regression models indicated that sample kebeles (ß= -0.102), sex (ß= -0.544), marital status (ß= -0.378) and years of residency of respondents (ß= 0.324) are significant predictors of local community willingness to participate in wildlife conservation activities. To ensure sustainable wildlife conservation in Hamer district, the study recommended managed livestock husbandry practices and water ponds should be prepared which can be used as water sources for both livestock and wildlife during drought seasons. Community based wildlife conservation and ecotourism should be promoted, and law enforcement are needed to halt illegal activities in the Hamer district.

Key words: Deforestation, livestock, local community willingness, overgrazing, wildlife threats

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Introduction

Current extinction rates are estimated to be one thousand times higher than fossil record the back ground extinction rates (Stork 2010). This is mainly due to climate change and habitat loss, which the world is currently experiencing. Balancing socioeconomic needs of the local community and wildlife conservation goals in a country experiencing climate change, recurrent drought, and political

unrest are challenging issues (Tesfahun et al. 2025). Particularly in developing countries like Ethiopia, wildlife conservation is challenging due to high natural resources and land demands for agriculture, settlement, grazing, fuel, and bush meat for people's subsistence. Agriculture-related deforestation has negatively impacted world biodiversity, though differing across regions and taxa (Hua et al. 2024). Outside protected areas, where most biological diversity exists, such pressure is increasing while conservation efforts are receiving less attention (Legese and Bekele 2023). The conversion of wildlife habitats to anthropogenic use diminishes the quality of habitats, rendering them incapable of sustaining the necessary resources for the survival and reproduction of wild animals'. In recent decades, Ethiopia has seen a significant conversion of forest and woodland vegetation into croplands for staple crop production. Reports indicate that agricultural expansion is responsible for 96% of deforestation in Ethiopia (Gifawesen 2019). For instance, 45 years' worth of data in agro ecosystems in western Ethiopia shows that the area of forest cover has been shrinking at an annual rate of 2.05% due to agricultural land expansion (Tadesse et al. 2024).

Poaching and illegal wildlife trades are also a major threat to effective wildlife conservation. Local communities hunt wild animals for different reasons, such as for bush meat, traditional medicine, live trade, and revenge killings of wild animals to mitigate depredation, which has threatened many wild animal populations (Goboro et al. 2024; Temesgen et al. 2025; Zisadza et al. 2025). For instance, 90% of the elephant population in Ethiopia has been lost since the 1980s, especially during regime change, due to poaching for ivory (Asmelash et al. 2024). Illegal trade of live cheetah cubs is also reported as a main threat for cheetah survival in the Horn of Africa, next to human-wildlife conflict, habitat loss and fragmentation, and low prey abundance (Evangelista et al. 2025). Food insecurity of local communities living around wildlife hotspots, high financial rewards derived from illegal wildlife trades, and inadequate law enforcement are the main drivers of poaching in developing countries (Goboro et al. 2024; Zisadza et al. 2025). These exert huge pressures on wildlife habitats, leading to habitat loss and fragmentation and force wild animals into confined areas, which ultimately leads to the decline of wildlife species' populations in the country. Human-wildlife conflict also poses a serious threat for wildlife survival and negatively affects the livelihoods of local peoples due to depredation, property damage, and moral threats from encounters with wild animals (Abdella et al. 2023).

The negative impacts of overgrazing on wildlife and their habitats are well-known in a country having largescale free-grazing livestock practices like Ethiopia (Demeke et al. 2017; Beyene et al. 2024). These practices alter the structure and composition of vegetation by promoting the growth of non-native unpalatable plant species. This shift results in a decrease in both the quality and quantity of available forage and water resources, leading to competition for resources between livestock and wild animals (Daba and Mammo 2024). Its impact is exacerbated in pastoralist and agro-pastoralist communities, particularly during drought seasons where pastoralists might travel over 45 km to access fodder and water for their livestock (Tschopp et al. 2010; Daba and Mammo 2024), causing high destruction of wildlife habitats. The same is true in the current study area, were pastoralists do not allocate grazing lands ac-

cording to seasons nor establish enclosures for their livestock during draught seasons (Admasu et al. 2010).

The Hamer people are one of multiple pastoralist ethnic groups in Ethiopia who heavily depend on dry forest resources for income and energy sources, livestock fodder, food, and medicine (Admasu et al. 2010). The Buska Forest is one of the remaining forest patches in the district, home to diverse wildlife resources and offering various ecosystem services. It also plays significant social, cultural, and economic roles for the Indigenous communities living in the surrounding areas (Melese et al. 2025). However, Buska Forest, along with other forest patches and wildlife areas in the district, have been increasingly threatened by recurrent droughts, climate change, and human activities. Consequently, forest cover in the district has significantly declined over the past decade (Melese et al. 2025). These natural and anthropogenic pressures have made wildlife survival difficult in the area, putting future existence of wildlife populations at serious risk. Therefore, the present study was conducted to identify (1) the major threats and challenges of wildlife conservation, and (2) assess the local community's willingness to participate in wildlife conservation efforts in the Hamer District.

Materials and methods

Study area

The study was conducted in Hamer District, South Omo, South Ethiopia Regional State. Geographically, the district is centered around 5°12'40"N, 36°20'10"E (Fig. 1). Dimka, a town in the district, is located 880 km away from Addis Ababa, the capital city of Ethiopia (Melese et al. 2025). The majority of the district has arid and semi-arid agro-climatic conditions (Admasu et al. 2010). The elevation ranges from 380 (Erbore lowland) to 2,100 m a.s.l. to the peak of Buska Mountain (Bekele et al. 2022). The majority of livelihoods depend on pastoralism and agro-pastoralism activities. Cattle, goat, and sheep are the main livestock reared while sorghum grain is the main crop cultivated by the Hamer people (Lumborg et al. 2021). They also support their livelihoods through the sale of honey (Admasu et al. 2010). The district receives an average annual precipitation and temperature of 757 mm and 22.7 °C, respectively. The district has a bimodal rainfall pattern. March and May are the main rainy seasons, whereas short rains occur between September and October (Bekele et al. 2022), making the area vulnerable to recurrent droughts. The areas are well known for biodiversity and support a variety of wildlife resources including mammals, birds, reptiles, amphibians, and insect species. The dominant vegetation species found in Busk Mountain and other forest patches in Hamer District are *Combretum molle – Terminalia brownii*, *Olea europaea – Juniperus procera*, *Acacia mellifera – Euclea racemose*, *Dichrostachys cinerea – Dodonaea angustifolia* and various other woody species, shrubs, and short grasses at varying densities (Admasu et al. 2010; Melese et al. 2025). The Ivangadi dance and bull jumping are among the unique cultural activities of the Hamer people that are performed by young men, marking their transition to adulthood (Gedecho and Guangul 2018).

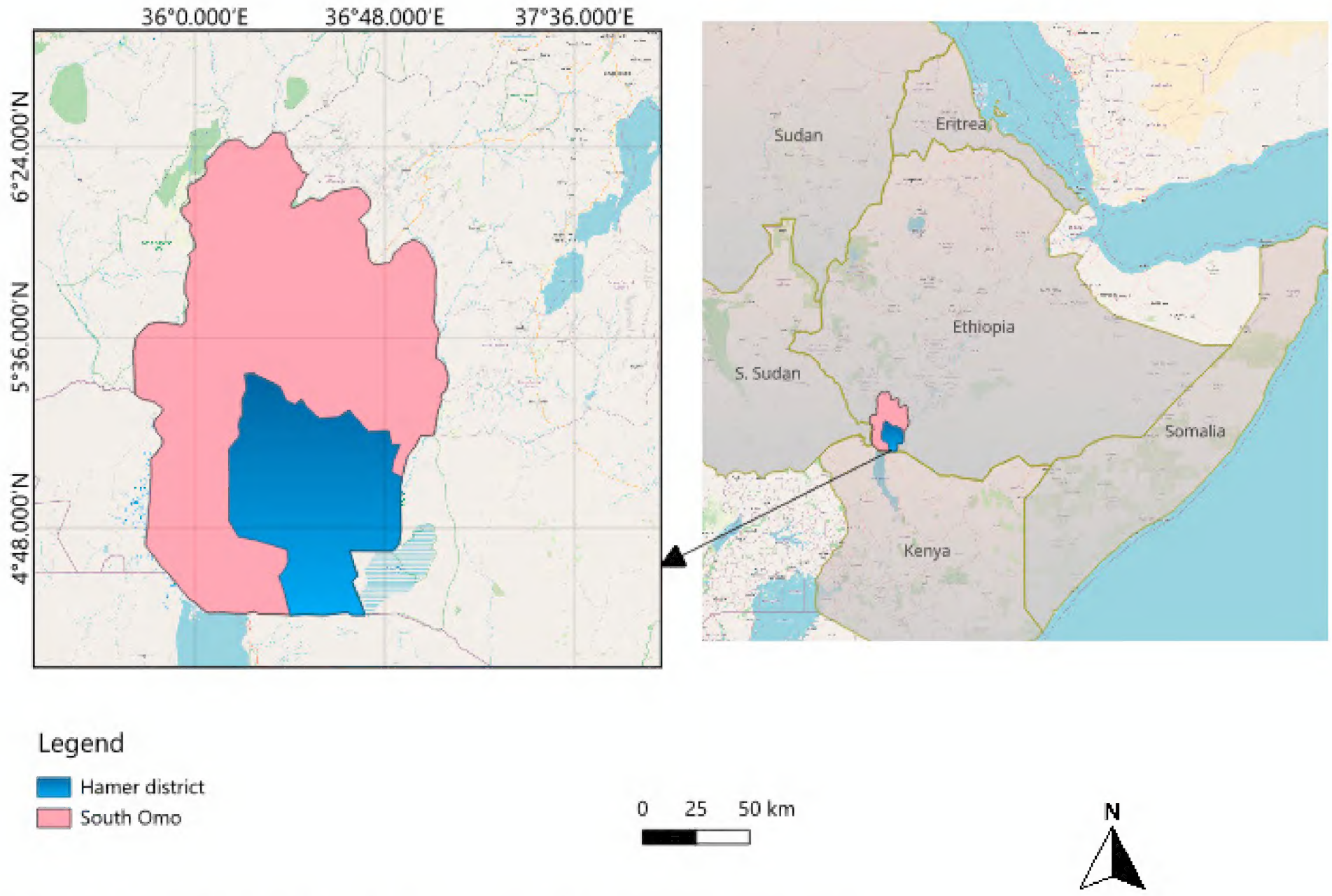

Figure 1. Map of Ethiopia showing the current study area the Hamer District.

Sample design and data collection methods

Hamer District has a total of 25 kebeles (the lowest administration units) according to the Ethiopian population census of 2007. Prior to the study, the research team traveled to Jinka (the administrative town of the South Omo Zone) to consult biodiversity experts. The Hamer District was chosen for the study due to its alignment with the study objectives, as well as considerations related to accessibility and security. Subsequently, four kebeles namely; Dimeka Zuriya, Besheda, Wero, and Shanko Kelema were chosen for the study after consulting experts from district biodiversity offices, taking into account accessibility related to time, financial constraints, and security concerns.

The sample size for the household survey was determined using a formula developed by Yamane (1967).

$$n = \frac{N}{1 + N(e)^2}$$

In the formula, n is the sample size, N is the population size, and *e* is the level of precision. Then, a total of 96 households were chosen for the household survey following the above formula with a 95% confidence level and a precision (*e*) of ± 10% due to homogeneity of the study populations and scattered households (Israel 1992). The sample sizes for each study Kebele were determined based on the number of households in proportion to the total amount of households in the four study Kebeles.

Household surveys

To assess the existing threats to wildlife conservation and local community willingness to engage in wildlife conservation activities in the wider community of the Hamer people, household interviews were held for over four weeks, between January and February 2022, using a pre-tested, semi-structured questionnaire. Households were randomly selected from the registered lists of household heads at each sample Kebele center. Afterward, each selected household was visited for interviews at their home with the assistance of Kebele experts. During questionnaire interviews, the household head was preferable for interviews, regardless of sex (Temesgen et al. 2025). In the absence of the head of the household during the visit, we interviewed an older household member who was 18 years of age or older. In case the household was closed, or the head was unwilling to participate, we moved on to the neighboring household (Addis et al. 2013).

The questionnaire included both open- and closed-ended questions which addressed the demographic profile of the households, years of residence of the household in the district, main wild animals that exist in their vicinity, importance of wildlife for the local community, trends of wild animals' populations, respondents' willingness to participate in wildlife conservation activities, and the main bodies responsible for the conservation of wildlife in their vicinity. In addition, we listed ten major wildlife threats (allowing respondents to list any more if there are any) and asked all survey respondents to rank the threats based on the severity of the destruction these threats cause to wildlife in the district.

The questionnaire was developed in English and then translated into the local language "Hameregna". Again, the responses of the respondents were translated into English during the interviews by interpreter whose first language was Hameregna and who are experts in the field of wildlife conservation. At least one researcher was also present during household interviews and focus group discussions.

Focus Group Discussions (FGDs) are complementary to other research methods and are important to gain in-depth data about specific topics while allowing the participants to explain and express their views freely (Gundumogula and Gundumogula 2020). Three FGDs were conducted, with participant numbers ranging from 5 to 8 individuals (Fig. 2), to collect in-depth qualitative information regarding the existing wildlife threats, the key responsible bodies for the conservation of wildlife, the participants' willingness to engage in future conservation initiatives, and the main wild animals utilized for different purposes by the Hamer people. Participants were selected from different demographics, such as community or cultural leaders, youths, women, Kebele administrators, and District agricultural experts. Furthermore, personal observations by researchers were also held to understand and triangulate the existing threats of wildlife conservation such as agricultural land expansion, settlement, deforestation, and overgrazing in the study area.

Prior to each interview and discussion, the objectives of the study and their right to withdraw from participating at any time were explained, and verbal consent was obtained from all participants. In addition, permissions were also gained from all survey participants to use their photographs during publication as necessary.

Figure 2. Focus group discussions held in Hamer District during the study.

Analysis

Descriptive statistics were used to distinguish frequency and percentage of respondents' demographic profiles. A Pearson chi-squared test was used to evaluate the statistical differences of respondents' views about the status of wildlife populations, urgency of and responsible bodies for the conservation of wildlife across sample Kebeles, sex, education, years of residency, or occupation of respondents. Multiple linear regression analysis was also done to determine the key factors that influence the respondents' willingness to participate in wildlife conservation activities in their vicinity. All statistical tests were analyzed using SPSS Statistics version 25 software and P-values less than 0.05 were considered statistically significant.

Results

Demographic characteristics of surveyed respondents

A total of 96 households were interviewed. The majority of respondents (67.7%) were male while the remaining (32.3%) were female. the majority of the respondent's age groups ranged between 40–60 years old (60.4%). All the surveyed participants are native to the study area. Most of the surveyed respondents (90.6%) have not obtained any formal education. Most surveyed respondents were married (78.1%). Both pastoral and agro-pastoral activities were the main livelihoods of the surveyed respondents (88.5%), while the remaining 7.3%, 3.1%, and 1% were engaged in government employment, trade, and as spiritual teachers for their livelihood, respectively (Table 1).

Table 1. Demographic characteristics of surveyed respondents (N = 96).

Variables		Frequency	Percentage
Sex	Female	31	32.3
	Male	65	67.7
Age	20–39	38	39.6
	40–60	58	60.4
Educational background	Uneducated	87	90.6
	Primary school	1	1
	Secondary school	1	1
	College	7	7.3
Marital status	Married	75	78.1
	Unmarried	18	18.8
	Divorcee	3	3.1
Occupation	Farmer (pastoral and agro-pastoral)	85	88.5
	Employee	7	7.3
	Trade	3	3.1
	Spiritual Teacher	1	1
Years of residence	20–39	38	39.6
	40–60	58	60.4
Study kebeles	Dimeka Zuriya	11	11.5
	Besheda	33	34.4
	Wero	15	15.6
	Shanko Kelema	37	38.5

Status of wild animal populations in Hamer District

Majority of the surveyed respondents (82.3%) acknowledged that the status of wildlife populations in Hamer District are decreasing, while only 1.1% of the respondents reported an increasing status of wildlife populations in the study area (Fig. 3). The respondents' views about the status of wildlife population differ significantly across sample Kebeles ($\chi 2 = 44.152$, df = 3, p = 0.000).

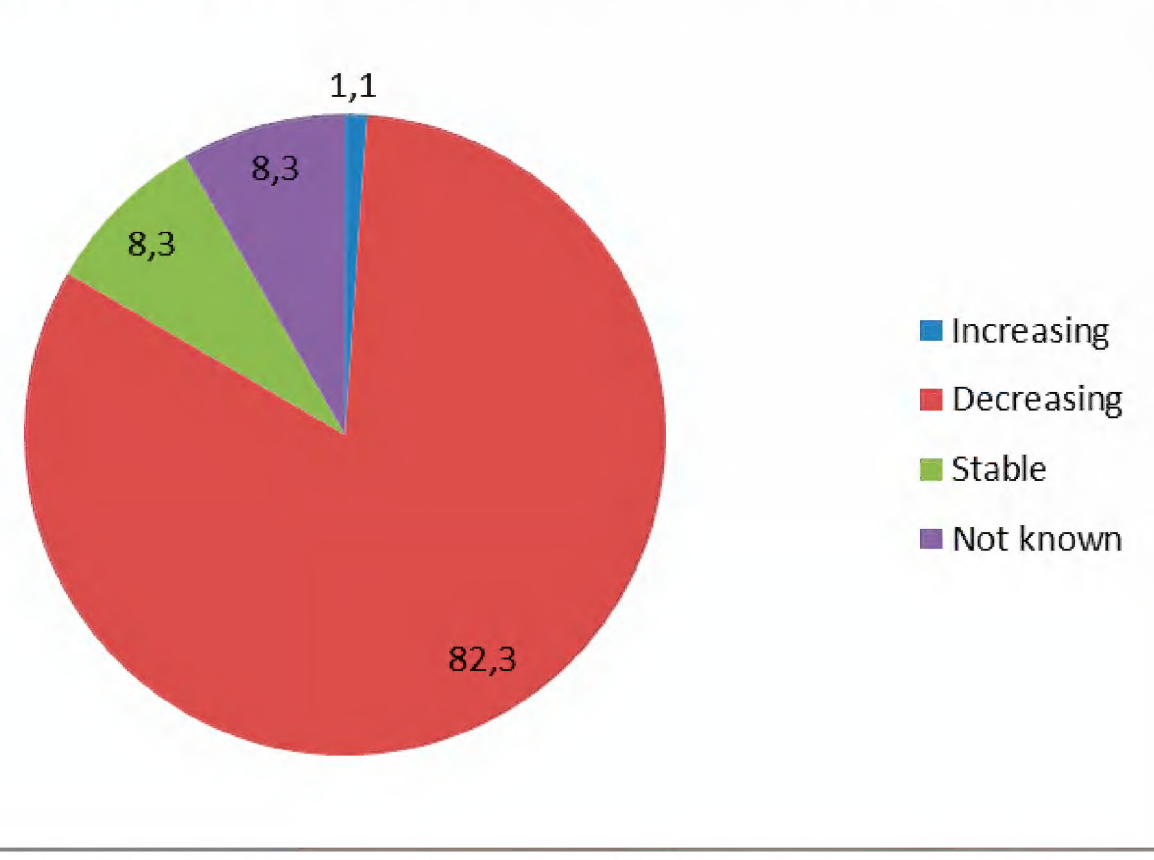

Figure 3. Wildlife population status in the Hamer District as reported by survey respondents (%).

Major wildlife threats in Hamer District

Respondents ranked ten principal threats to wildlife in the Hamer District. The majority ranked deforestation (63.5%) and overgrazing (50.0%) as the top and second most significant threats to wildlife survival in the area, respectively. In contrast, human-wildlife conflict was ranked as the seventh most important threat to wildlife conservation by most (65.6%) respondents in the present study area (Table 2).

Wild animals and their traditional uses

Survey respondents listed some wild animal species used for different purposes by the local people in the Hamer District (Table 3). Some of the listed species are threatened and the existence of certain species in the area, such as giraffes and ostriches, is uncertain.

Table 2. Major wildlife threats identified and ranked by surveyed respondents in Hamer District.

No.	Threats of wild animal identified	Rank %						
		1st	2nd	3rd	4th	5th	6th	7th
1	Deforestation (settlement, charcoal)	63.5	22.9	6.3	6.3	1.0	-	-
2	Agriculture land expansion	1.0	15.6	25.0	35.4	16.7	5.2	1.0
3	Overgrazing	30.2	50.0	18.8	1.0	-	-	-
4	Illegal hunting	5.2	10.4	44.8	39.6	-	-	-
5	Human-wild animal conflict	-	-	5.2	-	12.5	16.7	65.6
6	Human induced fire	-	-	-	2.1	46.9	26.0	25.0
7	Others				14.6	24	52.1	9.4

Others: invasive species, climate change, mining, and mass-tourism

Table 3. Some of the wild animals found in Hamer District and their traditional uses by local people as reported by survey respondents.

No.	Common name	Traditional uses
1	Baboons	Not reported
2	Monkeys	Not reported
3	Colobus monkey	Skin hair for decoration
4	Warthog	Bush meat and traditional medicine
5	Dik-dik	Bush meat, cultural belief and mats
6	Hyena	Not reported
7	Buffalo	Bush meat, traditional medicine and traditional shoes
8	Guinea fowl	Bush meat
9	Francolins	Bush meat
10	African savanna hare	Bush meat and traditional medicine
11	Giraffe*	Bush meat and decoration
12	Ostrich*	Bush meat and decoration
13	Elephant	Bush meat and ivory
14	Python	Traditional medicine
15	Leopard	Skin for cultural belief and bravery
16	Lesser kudu	Bush meat and skin for mats

* Local existence of populations are uncertain

Respondents' willingness to participate in wildlife conservation

Of the total 96 surveyed respondents, the majority (90.6%) expressed a willingness to engage in wildlife conservation campaigns, whereas, the remaining (9.4%) were not interested in participating in wildlife conservation efforts in their area. The multiple linear regression models indicated that some of the demographic variables such as sample Kebeles (ß= -0.102), sex (ß= -0.544), marital status (ß= -0.378), and years of residency of respondents (ß= 0.324) were significant predictors of local community willingness to participate in wildlife conservation activities in the Hamer District (Table 4).

Responsible bodies and urgent needs of wildlife conservation in Hamer District

Almost all (99%) surveyed respondents reported that the need for wildlife conservation work in the Hamer District is urgent, and most surveyed respondents (96.9%) also reported that the local communities have a responsibility to conserve wildlife in their locality (Table 5). Respondents' views regarding which bodies are responsible for wildlife conservation showed statistically significant differences between sample Kebeles ($\chi2$ = 23.930, df = 3, p = 0.001), educational backgrounds ($\chi2$ = 54.055, df = 3, p = 0.000), and occupations ($\chi2$ = 21.393, df = 3, p = 0.002). All respondents reported that the local community used wildlife for different purposes.

Discussion

Respondents ranked the ten most important threats to wildlife survival in Hamer District. Deforestation and overgrazing were the primary threats ranked by survey respondents. Both threats contribute most to declining wild animal pop-

Table 4. Multiple linear regression analysis of demographic factors that determine local community willingness to engage in wildlife conservation activities in the Hamer District, South Omo, Ethiopia.

Model		Unstandardized coefficients		Standardized coefficients	t	P -value
		B	Std. Error	Beta		
1	(Constant)	1.247	.201		6.198	**.000**
	Sample Kebeles	-.102	.023	-.377	-4.507	**.000**
	Sex of respondents	-.544	.061	-.873	-8.971	**.000**
	Educational background of respondents	.028	.034	.103	.818	.416
	Marital status of respondents	-.378	.066	-.649	-5.773	**.000**
	Occupation of respondents	.075	.048	.208	1.553	.124
	Residency of the respondent in the study area	.324	.057	.543	5.648	**.000**

a. Dependent Variable: are you willing to participate in wildlife conservation activities?

Table 5. Responsible bodies for the future conservation of wildlife in Hamer District.

Responsible bodies	Frequency	Percent
Local communities	93	96.9
NGOs	1	1.0
All stakeholders	2	2.1
Total	96	100.0

ulations and shrinking of their habitats in the present area. It is well reported that in regions with growing human populations and recurrent drought that local communities consistently seek alternative resources to support their families and livestock for survival. Natural resources are being cleared to meet the land demands for settlements and farmland, to provide trees for house construction, and for charcoal used as fuel in homes and markets which accelerates habitats degradation and fragmentation, directly contributing to and hastening the local extinction of species. Similarly, deforestation through encroachments into wild animal habitats, either in protected or unprotected areas, for human uses and overgrazing are the major threats towards wildlife survival in Ethiopia (Gashe et al. 2018; Woldegiorgis and Mekonnen 2021; Biru 2022; Kassie et al. 2023; Gibru et al. 2025) and elsewhere in the world (Zemanova et al. 2017).

Pastoralists and agro-pastoralists are continuously competing with animals for resources in Africa. Particularly, in during drought seasons when resources are scarce in the area. As a result, pastoralists are forced to move their livestock to habitats typically occupied by wild animals for grazing and watering. This movement leads to increased direct contact with wild animals, which perhaps creates competition and leads to depredation, and causing retaliatory killing of wild animals (Asfaw et al. 2025). In line with the present finding, Abie et al. (2024) also reported that sharing of wild animal habitats is increasing frequent contact and causing depredation events. As a result, the pastoralists developed negative attitudes towards carnivores in the Abobo district, Gambella National Park, western Ethiopia. Sharing of habitats between domesticated and wild animals is also expected to be higher in human dominated landscapes like the present study area, where legal wildlife protection is absent. For instance, a study conducted in Kenya examined the coexistence of livestock and wildlife at shared watering points and found that competition led to a shift in the watering times for wildlife (Connolly et al. 2021). Beyene et al. (2024) also reported the impacts of heavy livestock grazing on the Swayne's Hartebeest populations in Senkelle Swayne's Hartebeest Sanctuary, Ethiopia.

Illegal wild animal hunting is also ranked as the third most important threat to wildlife in the study area. Survey respondents and focus group discussions participants reported that wild animals were hunted in Hamer for different purposes. Wild animals are hunted for bush meat, to treat ailments, ivory for household income, skins for traditional clothes and mats, and feathers and tails for decoration. For instance, buffalo, elephants, warthogs, giraffes, rabbits, colobus monkeys, antelopes, and bird species, including ostrich, guinea fowl and francolins, are among the wild animals hunted by local communities for their products, which contribute to the decline of wildlife populations in the Hamer areas. Similarly, local communities in other parts of Ethiopia (Kebebew et al. 2021; Kumera et al. 2022; Biru et al. 2022) and elsewhere in the world (Mardiastuti et al. 2021; Cheung et al. 2021; Zisadza et al. 2025) use wild animals and their products for traditional medicine, sources of protein for their family, and income sources by selling their products such as meat, skin and ivory in markets. Likewise, elephant populations in Moyowosi Game Reserve, northwest Tanzania (Goboro et al. 2024) and endemic and endangered Swayne's Hartebeest populations in Nech Sar National Park, Ethiopia (Shibru et al. 2020) showed decline due to anthropogenic pressures. Unfortunately, none of the survey respondents nor focus group discussion participants reported

zoonotic diseases as a threat for wildlife conservation despite previous studies reporting the prevalence of zoonotic diseases such as bovine tuberculosis and trypanosomiasis in the area, which affect both livestock and wild animals in Hamer district (Admasu et al. 2010; Tschopp et al. 2010). The possible reasons might be related to the present sample Kebeles being somewhat far from the Murule Controlled Hunting Area and/or the local peoples in the current study areas may lack awareness about zoonotic diseases which affect both their livestock and wild animals.

Human induced fire is also another threat to wildlife reported by surveyed respondents in the current area. We have also observed active fires during our field visit (Fig. 4). Sometimes local communities in Hamer district introduce fire in the wild animal habitats intentionally to clear lands for agriculture and settlements, and bush encroachments, which destroy the natural habitats, ultimately may cause wildlife loss in the area. Likewise, local communities in Konta Special District, southwest Ethiopia (Temesgen et al. 2025), and in the Noun Valley, Cameroon (En and Sjp 2024) introduced fire into wild animal habitats to clear vegetation covers for different reasons such as charcoal, farmland, settlement, honey collection, and hunting.

Despite the local communities in Hamer district struggling for survival due to recurrent drought and erratic seasonality, they still have the goodwill to participate and take responsibility for the conservation of wildlife and to coexist with wild animals found in their surroundings. These may be related to the ecological services they received. For instance, Busk Forests serve as refuges for their livestock to escape drought seasons, and medicinal, traditional, and cultural values of wildlife for the local communities are of high importance. Local people may have shown positive attitudes towards wildlife conservation due to different motives (Temesgen et al. 2025). Similarly, pastoral communities around Awash National Park showed positive attitudes towards wildlife conservation since the park remains the ultimate source of feed and water during peak dry seasons (Biru et al. 2017). Likewise, the local communities living around Kru-

Figure 4. Human induced fire in the Hamer District observed during the field visit.

ger National Park, South Africa support wildlife conservation and acknowledge the non-consumptive value of wildlife while appreciating sustainable utilization (Moorhouse et al. 2025). As reported in the current study and supported by other research (Katswera et al. 2022; Munaw 2023), community participation in wildlife conservation activities is influenced by their educational background and the number of years they have lived in the area. Residents who have received formal education and have resided in the area for an extended period tend to have a greater appreciation for conservation and express greater willingness to engage in conservation activities (Temesgen et al. 2022).

Conclusion

The survey's respondents in the present study ranked ten major wildlife threats which cause the decline of wildlife populations in Hamer district. Deforestation and overgrazing are perceived to account for the largest share of wildlife habitat destruction. The majority of the local community in Hamer areas are pastoralists and agro-pastoralists, hence, alternative grazing lands and managed husbandry practices are essential to maximize production and ensure livelihoods of the households. Moreover, such activities can be used to retain their positive will towards conservation, reduce wildlife habitat destruction, and ultimately promote human-wildlife coexistence in the current study area and further afield. Additional seasonal wildlife research should be conducted to better understand the diversity of wildlife species and ecotourism potential in the area.

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Additional information

Conflict of interest

The authors have declared that no competing interests exist.

Ethical statement

All interview participants provided verbal consent for the anonymous use of their data in publication.

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Data availability

All of the data that support the findings of this study are available in the main text.